A few notes on rendering with VMD

(Dated: September 11, 2016)

In this document I focus on giving a short overview of the rendering options in VMD, along with a side-by-side comparison. This overview is not exhaustive and for more details on settings the reader is referred to the VMD website: `http://www.ks.uiuc.edu/Research/vmd`

The most common flavors of rendering are 'snapshot' and 'TachyonInternal':

```
render snapshot test.tga
render TachyonInternal test.tga
```

The former is suitable simply for capturing information without worrying about fancy looks, while the latter can give a very nice result with the right settings. The options for settings are extensive, but I tend to use for example:

```
display ambientocclusion on
display aoambient 0.75
display aodirect 0.75
```

Tachyon and PovRay are supposed to give a somewhat nicer result and more options, but you have to install the respective software.
To render with Tachyon, locate the following file:

```
/Applications/VMD\ 1.9.2.app/Contents/vmd/tachyon_MACOSXX86
```

I copied this file to my home directory, but you can refer to wherever you prefer to store the file. In the following example I write 'path' where you should add the path to the Tachyon file:

```
render Tachyon test.dat "path/tachyon_MACOSXX86" -aasamples 12 %s -format TARGA -o %s.tga
```

TachyonInternal and Tachyon are reasonably close to each other, while PovRay has the great additional advantage of allowing for rendering with a transparent background (which the other options do not allow):

```
render POV3 test.pov povray +W%w +H%h -I%s -O%s.tga +X +A +FT +UA
```

The options indicate the resolution of the render in width (+W) and height (+H), you can specify values (for example +W1000 +H800) or use the current screen size (+W%w +H%h). Furthermore, there is a flag to make it possible to abort the rendering process (+X), anti-aliasing (+A), Targa file format (+FT), and the transparent background (+UA). Note that depth cueing needs to be off for the transparent background to take effect!

How a side-by-side comparison looks depends on the materials used. Most difference will be seen in shininess and transparencies. Note that you can easily adjust these (and other) material properties:

```
material change shininess Transparent 0.15
material change opacity Transparent 0.3
```

The following figure shows a side-by-side comparison of the different render options, keeping the same display settings and materials for pictures 1-4. The pictures denote: (1) snapshot, (2) TachyonInternal, (3) Tachyon, (4) PovRay, and (5) PovRay after reducing the shininess and specular settings of the transparent material. The blue rectangle in the background serves to demonstrate the transparent background in the PovRay renders.
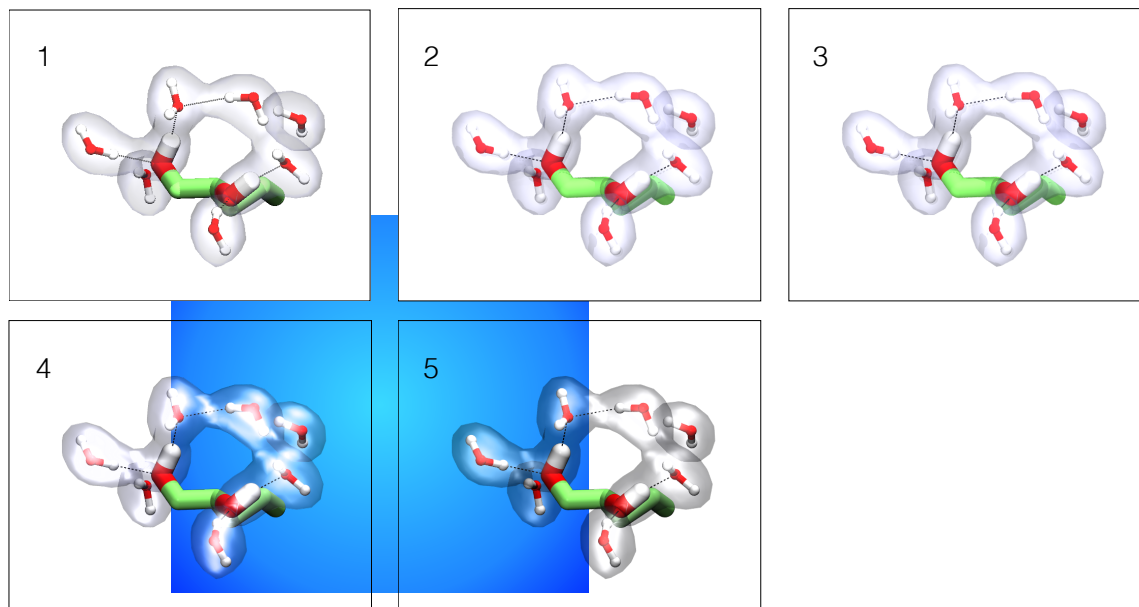
Rendering with a transparent background makes it possible to make a picture containing an overlay of various layers. An example of this is the following picture: